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creed; and that it is the duty of every man to develop, by his own thinking, his individual conviction. This he will do if he knows how to appreciate sufficiently the deity within his breast.

One God, one philosophy, or one creed is to be found only in heaven; on the earth are millions of Selfhoods or Souls, and, hence, millions of spontaneous convictions. Some great aim—for example, the fighting for native land, or for virtue, liberty, light, and progress—happens to be, in this world, the common tie among them. In such cases, all men, truly cultivated and free, become as one man.

(*To be concluded in the next number.*)

OBJECTS AND THEIR INTERACTION.[1]

BY JAMES WARD.

We may come eventually to doubt the possibility of isolated simple objects as the psychical atoms, so to put it, of which our mature perceptions and intuitions are built up; still it will be best to let this conception pass unchallenged for the present. But in any case we can have no direct acquaintance with them. For the simple object is to be conceived without relations to other objects, either temporal, spatial, substantial or causal: it is presented to a subject and has Position in this sense, and that is all. Those definitions of it, therefore, which involve a reference to the body are psychologically manifestly faulty. And even when brought into relation with other objects, it does not admit of classification, for it has not qualities, but only a quality, whereas classification is only possible where there is both agreement and difference, or, in logical language, both genus and differentia. Thus, since quality implies classification, we ought, perhaps, when exact, to speak of the content rather than of the quality of a simple object. The conception of an object or sensation pure and simple is, in fact, a limit

[1] [Discussed at the Moral Science Club, at the rooms of Mr. James Ward, M. A., Fellow of Trinity College, Cambridge University, England. Printed in this journal by permission of the author.—ED.]

we never reach, and never can reach, by real analysis. But we know directly—*i. e.*, by actual decomposition—that many, nay most, of the objects we ordinarily take to be homogeneous and single are really heterogeneous and compound;[1] and we have indirect evidence that such complexity exists even further than we can directly trace it.[2] Hence, though we cannot reach a demonstrably simple object, it is often assumed that there are such, and, in attempting to give a constructive or synthetic account of mind, psychologists, such as Spencer, Lewes, and others, start from this ideal limit.[3] And it is evident that in such a conception we have reached in one direction the "utmost verge" of psychology, if we have not even gone beyond it.

But whatever grounds we may have for regarding our ordinary sensations as complex, we are certainly not warranted in attributing this complexity to association as we know it. Between the complexity of the sensation of purple, and the complexity of the perception of an orange, there is a twofold difference: (1) the elements of the former, when separately presented, do not revive each other, whereas the sensations associated in the latter do; and (2) the complex in the latter case is, but in the former is not, the sum of its constituents and directly analyzable. It is quite possible both modes of composition have something in common at bottom; but however this may be, distinct terms are necessary to prevent them from being confused. Without attaching any importance to Mill's conception of mental chemistry, we shall, I think, do well to speak of the complexity of our ordinary sensations as due to combination.

There is one fact about the relation of these ordinary sensations to each other which, though well known to physicists, is scarcely recognized by psychologists;[4] and that is that in several cases,

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[1] The clearest case is Helmholtz's discovery of the composite character of musical notes, vowel sounds, etc.; next come mixed colors, the combination of taste and aroma, taste or smell, and pungency; the touch of a wet surface, etc., etc. Cf. on this point Helmholtz, "Lehre von den Tonempfindungen," Abt. 1, § 4 fin.

[2] In the case, *e. g.*, of musical tones; in the variations of quality in colors, and even in sounds, as the intensity is varied; in similar variations depending upon the extent of surface stimulated, etc.

[3] Cf. esp. Spencer's chapter on the Substance of Mind, "Psychology," vol. i.

[4] Wundt is the one conspicuous exception, and he apparently only because he treats of physiological optics, acoustics, etc.

perhaps in all, they constitute groups of *continua*. A musical tone or the color of the sky does not admit of classification any more than the position of London does; but as this belongs to that continuum we call the surface of the globe, so do they to a continuum of tones and colors respectively. But by a continuum here I mean a series of objects such that between any two a series of others may be, or may be conceived to be, interposed so as to differ the less the more they approximate in the series. We may represent the form of a continuum spatially so long as the kinds of difference do not exceed three. When one of these differences is intensity, we find very strikingly in some cases, but more or less in all, that continuous change of intensity involves continuous change of quality too.[1] Among motor objects we find groups of continua of two kinds—(1) what I have called motor objects proper, the feelings of innervation, effort or resistance of psychologists, and (2) auxilio-motor objects, *i. e.*, those muscular sensations by which we come, to know the position of our limbs. Of the last there are, of course, several groups, and the constituent objects are manifestly complex. Under normal circumstances motor objects are always accompanied by auxilio-motor, but in disease or passive movements they are separated, and their distinctness thus made manifest. In motor objects, qualitative differences are at a minimum, the continuum consisting almost wholly of gradations of intensity. We shall have to return to these in analyzing our space perception; at present I want to bring into one view still more elementary facts.

The first of these is as important as it is obvious: the fact, viz., that there are some objects the presentation of which is an absolute bar to the simultaneous presentation of others. Now, we shall find that such incopresentable objects are those which are members of the same class, or rather continuum. Any color may be presented with any sound, or taste, or temperature. But one color inhibits another: and one taste or touch another in like manner. Still, many things are parti-colored, and we may feel hot on one

[1] The most striking case being that of color, all colors alike approximating to white or black as the illumination increases or decreases. Musical notes become harsh when too loud, though pure tones, I believe, do not. In these facts we have, as already mentioned, evidence of the complexity of color and notes. In temperature the chief variation is in intensity, the qualitative variation being small.

side and cold on the other. Thus, we have here a new complication, and one which it may be thought can only be explained by the help of space. But space is not the only *principium individuationis*, for several tones may be presented simultaneously, between which there is no spatial relation. But then they must all be different, whereas several colors or touches, apparently identical, can be presented together. We are thus brought to recognize a fact commonly overlooked—what Mr. Bain calls the mass or volume of a sensation. It is, however, worth while trying to give a more precise account of it than Mr. Bain does. The field of sight or the irritation of a mustard plaster are instances of a mass of sensation. Of such we cannot, I think, say that they consist of a number of objects identical in quality and intensity, but distinguished by difference of place. For, although this fact of massiveness as distinct from intensity is an essential element in our perception of space, it is evidently not the whole of it. In this experience of massive sensation alone it is impossible to find other elements which an analysis of spatial intuition yields. But we may say that the constituent objects in question are not really identical in quality, but that each is a combination of one of a number of qualitatively identical objects with one of a continuum. To such continuum we may, if we choose, give the name of "spatial qualia" or "local signs,"[1] provided we regard it as merely a continuum of objects, and not as a space. The simultaneous presentation of two different objects is a fact for which we do not feel bound to seek a reason, but for the simultaneous presentation of two apparently identical objects we do.

If we can justify this hypothesis of continua of local signs, we can give a more exact expression to the incopresentability of certain objects. Thus, in any given continuum, we should say that the same local sign cannot at the same time be united with more than one object out of a series, all of which may be successively united with it, and any of which may be simultaneously united with other local signs in the same continuum. We may represent this symbolically. Thus, if $A \ldots B \ldots C \ldots D$ be the continuum of colors, $r_1\ r_2\ r_3\ r_4 \ldots$ the continuum of local signs with which

[1] For an exposition of this brilliant speculation of Lotze's, see his "Metaphysik," B. iii, ch. iv.

color is combined, then $Ar_1\ Ar_2\ Ar_3$ or $Ar_1\ Br_2\ Cr_3$ is possible simultaneously, but not $ABr_1\ BCr_2$, though $Ar_1\ Br_2$ may be followed by $Br_1\ Cr_2$, and so on.[1] But even this statement that Ar_1 may be followed by Br_1 is too general. That there is some law, even in the succession of sensations, is shown by the existence of complementary after-sensations, or after-images, as they are less exactly called.[2]

The intensity and extensity (*sit venia verbo*) of compound presentations of the same group are not independent. An increase of intensity in any given object involves the simultaneous presentation of others in the same continuum. To this corresponds Lewes's Law of Irradiation, though I fear there are no facts to justify the wide range he gives it. The conditions of irradiation are, however, very different in different senses, irradiation being least in the highest senses, *i.e.*, where voluntary attention is most excited. Again, an increase in the volume of a sensation is so far equivalent to an increase in intensity that objects which do not otherwise rise above "the threshold of consciousness" secure attention by such increased extensity. Thus, in determining the *minimum sensibile*, both quantities have to be taken into account.

The above are some out of a number of facts which have been supposed to lie outside the pale of psychology. Let us now pass to those interactions of objects commonly allowed to be psychological, where these discarded facts may be found to help us. A preliminary question meets us here, viz., as it is ordinarily worded, whether we can be conscious of, or attend to, more than one thing at a time. Unless an affirmative answer can be given to this question, psychologists who discuss the interaction of objects must be much deluded men. But, in fact, the whole

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[1] The sense of hearing, however—so far, at least, as tones go—seems an exception, or rather a special case. For it is doubtful, I think, whether volume of sound, as distinct from intensity, is possible. If so, we cannot have $Ar_1\ Ar_2\ Ar_3\ldots$, but only $Ar_1\ Br_2\ Cr_3\ldots$.

[2] Of these, the most striking instances are furnished by sight. If we stare at a bright spot on a dark ground, and then look away, we see a dark spot on bright ground. If we dip a hand into warm quicksilver, the hand feels cold on withdrawing it; if into cold, it feels warm on being withdrawn. After carrying a weight, and experiencing the effect of gravitation, we come for a while to believe in "levitation." There exists at present no general investigation of this subject, though Hering's speculations make it one of great interest.

question is due to a confusion between voluntary concentration of attention and that non-voluntary attention which mere presentation determines. It is true that attention cannot have two foci, but it is not all focus. As in the special case of sight, we see much more than we look at, so we must admit, in the general case, a field as well as a focus of attention.[1] Subject then only to the law of incopresentability objects of every sort and kind may be presented together, and, being so presented, become "associated." Of this association we have not, I think, any evidence at the time it may be supposed to have taken place: it is not till some one or more of the objects is presented again that the association becomes manifest. We find that the association is more complete the more intense and the more frequent the presentation. But what *is* the fact itself, our ignorance of which we cover by this simile of association? Do objects really stick or fuse together when they are simultaneously presented often enough and at the requisite intensity, as Mr. Bain's "adhesion by contiguity" might seem to imply? Or are they bound by hidden links, by which they drag each other on and off the stage of consciousness in accordance with Herbart's psycho-dynamics? Lotze is of opinion that any investigation into the nature of association must be fruitless.[2] But, if so, association should be a first principle, and ought to admit of such a statement as shall remove the need for inquiry. So long, however, as we are asked to conceive presentations, originally distinct and isolated, becoming eventually linked together, we shall, I think, feel the need of some explanation of the process. For neither the isolation nor the links are clear. Not the isolation, for we can only conceive two presentations separated by other presentations intervening in a continuum or a series of presentations; nor the links, unless these also are objects, and then the difficulty recurs. But if for contiguity we substitute continuity, and suppose the "associated" objects to be parts, not isolated wholes, we shall have to ask first, not how the distinct and originally disconnected objects, $A\ B\ C$, are converted into a unity, $\underline{A\ B\ C}$, but how an originally undifferentiated presentation, or mass of presentations (ABC), a *totum objectivum*,

[1] Wundt's "Blickfeld und Blickpunkt des Bewusstseins."

[2] "Metaphysik," s. 526.

as it were, becomes separated into partially distinct objects. Against this view it cannot be urged that such differentiation involves, at bottom, the same inconceivability as the commonly assumed process of integration. We cannot conceive the homogeneous becoming heterogeneous, it is true, but we can suppose differences, which were obscure before, to become distinct through changes in the intensity of presentation or attention. And we are by no means without evidence in support of this supposition. The question has been canvassed in part already in discussions concerning the *primum cognitum:*[1] that attention proceeds in the main analytically, is first extensive and general, then concentrated and intensive, there can be no doubt. The increased sensibility of sight, touch, hearing, and even of taste and smell, consequent on practice, can be represented as due to a restriction of intensity to a particular object in a continuum over which the intensity was irradiated before. It is quite impossible now to imagine the effects of years of experience removed, and to picture the character of our infantile presentations before our own movements had enabled us to localize or project them, and before our interest had led us, habitually, to concentrate attention on some and to ignore others, whose intensity thus diminished as that of the former increased. In place of the many things we can now see and hear there would then be not merely a confused presentation of the whole field of vision and of a mass of indistinguishable sounds, but even the continua of sounds and sights themselves would be without their present distinctness. Thus, the farther we go back the nearer we approach to a total presentation which had the character of one general continuum in which differences were latent. Even if there were no other grounds for assuming the existence of such a continuum, the facts of association would almost justify it; for in what other way can we represent to ourselves the connection between one presentation and another? And, after all, what else do psychologists mean by the unity of consciousness at any moment?

But, even if we see grounds for rejecting the current conception of isolated objects, we shall find, I think, yet other difficulties in the conceptions of Re-Presentation commonly received. We shall,

[1] Cf. Hamilton, "Metaphysics," ii, pp. 327 ff.

I presume, agree at once to reject as extra-psychological every attempt to explain this fact by the properties of nerve-substance. From the days of Descartes onwards such explanations have been in vogue, and yet it is evident at once that they involve terms that are psychologically unmeaning. It may be that re-presentation is psychologically inexplicable, although its physiological counterpart is known and admits of explanation; but we cannot make this explanation do duty for a psychological one any more than we can tie a knot in a ring with our fingers, because the problem is analytically feasible in space of higher dimensions. But what do we mean by Re-presentation? Postponing for a while the inquiry into the differences between presentations and re-presentations in the sense of impressions and images, let us consider simply what we understand by the re-presentation after an interval of some particular image. To this end, we must take a case in which there is not merely re-presentation, but memory. A certain idea (m_2) occurs to us, and we say we recognize it as identical with (m_1), which occurred some time ago. But now there cannot be two images here, or we could not, with any exactness, speak of identity or re-presentation, and yet there must be something to justify the distinction of "now" and "then." In other words, there can be no classification of m_1 and m_2 as two images identical in kind; there can only be a single presentation (m) complicated [1] with certain other presentations, making the total to be $m_{1,2}$. Actual observation will, I feel confident, show this to be in fact the case. What, then, is true, when only we can *know* that we are dealing with re-presentation, forms, or ought to form, part of our conception of re-presentation. Wherever we talk of re-presentation there is so far one identical image as the kernel complicated with certain others; and these may, on occasion, constitute the whole into a memory-image. If so, there is something distinctly misleading in Mr. Spencer's exposition of what he calls "the Associability of Feelings." The following is what he gives as the "most general statement" of it: "Be there, or be there not, any other kind of association, the primary and essential association is between each feeling and the class, order, genus, species,

[1] This is a term that calls for explanation, which, I trust, will be forthcoming by and by.

and variety of preceding feelings like itself."[1] Not to quarrel just now with this unusual use of the term Association—though it is singular that a form of association to which Mr. Spencer devotes two long chapters, recognizing no other, is set aside by Professor Bain, in a single sentence, as unimportant[2]—what I wish to call in question at this point is simply the idea of a series of images, a_1, a_2, a_3 . . . which sort themselves, and are ever accumulating, like spirits on the banks of the Styx. If I see a certain color or a certain thing a hundred times, I have not a hundred images, but one image: each succeeding presentation adds certain environing complications, some of which may be more intensified at one time, some at another.

What, now, do we know concerning this central image in the intervals when it is not consciously presented? Manifestly our knowledge in this case can only be inferential at the best. But there are two facts, the importance of which Herbart was the first to see, from which we may learn something: I refer to what he calls the rising and falling of presentations. All presentations having more than a liminal intensity rise gradually to a maximum and gradually decline; and when they have fallen below the threshold of consciousness altogether, the process seems to continue, for the longer the time that elapses before their "revival," the fainter they appear when revived, and the more slowly they rise. This evanescence is most rapid at first, becoming less as the intensity of the presentation diminishes. It is too much to say that this holds with mathematical accuracy, although Herbart has gone this length. Still, it is true enough to suggest the notion that an object, even when it is no longer able to influence attention, continues to be presented, though with ever less and less absolute intensity, till at length its intensity declines to an almost dead level just above zero. So far as the rising or sinking of an object is due to attention or to the interaction of other objects, we may attempt a psychological explanation of it; but where it is due directly to the object itself, no psychological account of the fact seems possible.[3]

[1] "Psychology," i, § 115, p. 256.

[2] "Mental Science," II, ii, 2, p. 128.

[3] So far from agreeing with Hamilton and his obscure German, Schmid (Hamilton, "Lectures," ii, pp. 211–216), that this fact is incapable of physiological interpretation, I

To sum up, then, as to Re-presentation: the account I would give of this conception is as follows: In the first place, regarding only the single object—such an object is presented. This primary presentation (or impression) is psychologically an ultimate fact, if it is not indeed an hypothesis to which our facts drive us. We have no experience of such a beginning, and yet must postulate one somewhere. Such presentation, once begun, continues indefinitely long. It may have an end as it had a beginning: oblivion is possible, but obliviscence seems the rule. What we call re-presentation is due to an increase in the intensity of such a persisting object, whereby it is sufficiently raised above the level of the general obscurity to form part of "the field of consciousness." But then, secondly, such object is only partially single; at the first it is actually part of a continuum of objects in such way connected with it that its further rise above the threshold of consciousness entails the rise of the adjacent parts of the continuum. When represented, however, it is found to be thus complicated with parts of other elementary continua to form a new continuum. We must be able to give some account of this new continuum if we are to explain the Association of Ideas.

The only association that can properly be called such is, so far as I can see, the so-called Association by Contiguity. At all events, it is with this only that I propose to deal now. Under contiguous association are included both the association of objects simultaneously presented, and that of objects presented in immediate succession. The last is, I think, the simpler; let us take it first. And here again the facts are clearest in the case of those objects over whose intensity the subject has most complete control—*i. e.*, in the case of movements. In such a series of associated objects, A B C D E, etc., we find that each member recalls its successor, but not its predecessor. Familiar as this fact is, it is not very easy to see any reason for it. Since C is associated both with B and

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would rather say that it is incapable of any other. These writers first regard the image as "an energy of the self-active power of a subject, one and indivisible," and then maintain that it cannot "be abolished without a laceration of the vital unity of the mind as a subject one and indivisible." The evanescence they explain by the finiteness of attention. But if this were the sole cause, why in reminiscence do we not find the object resume its former vividness? I know nothing more transparently feeble than this metaphysical psychology which Hamilton has contrived to appropriate.

D, and apparently as intimately associated with the one as with the other, why does it revive the latter only and not the former? B recalls C, why does not C recall B? If we consider the intensities of B C and D at the moment when attention is about to be fixed upon D, it is evident that the intensity of B will be less than that of C, and waning, while the intensity of D will be as great or greater, and waxing. Thus, association in this case appears to depend upon comparative intensity. The same will, I think, be found true of sensory objects, though here the complication is much greater. Interest apart, attention—*i. e.*, to say non-voluntary attention—passes from the less to the more intense objects. And where interest or expectation is great, objects presented in one order are often attended to in another. In both cases, I think, it will be found that the order of representation is the order of attention—the order, *i. e.*, in which the objects occupied "the focus of consciousness."

The next question is whether the association of objects simultaneously presented can be resolved into an association of objects successively attended to. When we try to recall a room we saw but for a moment, there are always a few things that recur distinctly, the rest being blurred and vague, instead of the whole being revived in equal distinctness or indistinctness. In a second presentation, our attention is apt to be secured primarily by the things unnoticed before, as these have the advantage of novelty, and so on till we have "lived ourselves into" the whole, when the whole admits of simultaneous recall. In such a case we have substantially what Herbart would have called *eine Verwebung von Reihen.* Professor Bain takes the trouble to admit something very like this in a single sentence, but not the least trouble to square his exposition with it.[1]

[1] "Mental Science" (on Successions), p. 112.